

# Work Order ID 55133

January 6, 2010 3:50:29 PM



Page 1

Item ID: D212-664-101

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Fwd

Start Date: 07/01/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date: 10-1-06

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr

Revision Nbr

D212-664-141

Rev D

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-101 CHG003

8/10/05

Pa LL 10/02/04

110

0.00



Pick Kit

Packaging

Packaging

Memo

0.00

Packaging

(IX) MB 10-01-26

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio FT015

(IX) MB 10-01-26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 55133**

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Revision ID:

Stop



Item Name: Crosstube Fwd

Start Date: 07/01/2010 Start Qty: 1.00

Cust Item ID:

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Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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130

QC15- Crosstube Dimensional Check

0.00

2) S1010126

(FL)

QC

Memo

0.00

Quality Control

140

0.00

Crosstubes

0.00

Crosstubes

Memo

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 &amp; DT8549

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8548 &amp; DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

4-Deburr &amp; inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

MB  
10-01-27

- 44M10-1-27

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Setup Start

Revision ID:

Stop

Item Name: Crosstube Fwd

Start Date: 07/01/2010 Start Qty: 1k

Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.0

Customer:

Reference:

Run Start

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

Chemical Conversion Coat within 24 hours of bending and drilling

1 - - A4M 10-1-28

160

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

27 81060129

(70)

170

Outsource process - NDT per QSI038 4.1

0.00



Outsource2

Memo

0.00

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038  
Issue P/O: 11890  
LPI as per ASTM 1417 Level 2  
Attach copy of NDT results to work order

PL 10-2-01

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Setup Start



Revision ID:

Stop



Item Name: Crosstube Fwd

Start Date: 07/01/2010 Part Qty: 1.00



Cust ID:

Required Date: 28/01/2010 Req'd Qty: 1.00



Customer:

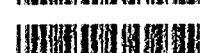
Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 	Receive & Inspect for Damage & Mat'l Certs Packaging	0.00							
	Memo	0.00							
	Packaging								
	Ensure copy of NDT results attached to work order.								
190 	QC5- Inspect part completeness to step on W/O	0.00							
	Memo	0.00							
	Quality Control								
	Inspect for damage & ensure results are as per Dwg D212-664-141								

*PC 10/2/10 (1)**MA 10 02 02 (1)*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Item ID: D212-664-101

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Setup Start



Revision ID:

Stop



Item Name: Crosstube Fwd

Start Date: 07/03/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 28/07/2010 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200 	Spray Painting per QSI005 4.2 SprayPaint	0.00							
	Memo	0.00							
	Spray Painting								
	1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME: Start Time: 8:00 Finish Time: 9:00								
	PAINT: Start Time: 3:00 Finish Time: 4:00								
210 	QC14- Inspect Spray Paint	0.00							
	Memo	0.00							
	Quality Control								
	Then, Wrap in plastic bag to protect from scratches								

MA 10 02 02 (1)

85 10 -02-03

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Start Date: 07/01/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: Date: Tooling: Date:

Stop



QC: Date: SPC (Y/N): Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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220

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond Batch: 112417 exp: 01/2011

Torque: ml 10/02/04

ml 10 02 03 ①

230

0.00



QC5- Inspect part completeness to step on W/O

QC

Memo

0.00

Quality Control

⇒ S. Colodoy

⑦

240

0.00



Pick Kit

Packaging

Memo

0.00

Packaging

10-2-4 sc

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**Work Order ID 55133**

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Item ID: D212-664-101

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Fwd

Start Date: 07/01/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00

Customer:

Reference:

Run Start

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

250

QC4- 100% Inspect kits for completeness

0.00

8/10/2/08



QC

Memo

0.00

Quality Control

260

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D212-664-101

MUE

270

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

10/02/09

MF

10-2-08

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

# Picklist Print

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Page 1

Work Order ID: 55133

Parent Item: D212-664-101

Parent Item Name: Crosstube Fwd

Comments: IPP RevH: as per ECN09-696 09.11.19 DD verified by:EC

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Rem. Qty	Qty Pick	Qty Issued	Date Issued	Status
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D212-664-101TRN Manufactured No

110

Each

3.0000

1.0000



Crosstube Turning Detail

B-54732 MB 10-01-20

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

FG

3

54284

1

54409

1

54502

1

D3595-063-450 Manufactured No

230

Each

180.5477

4.2105



RUBBER CUSHION

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

LG

75.5788

52447

75.5788

Main Warehouse

ST

104.9689

38959

2

43210

2.59

46465

0.3789

53775

100

10/02/03

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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# Picklist Print

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Work Order ID: 55133

Parent Item: D212-664-101

Parent Item Name: Crosstube Fwd

Comments: IPP RevH: as per EC: 02-696 09.11.19 DD verified by:EC

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Qty Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty Held	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21920-25		Purchased	No			220	Each	193.0000	4.0000			

Clamp(per MIL-DTL-8783C)

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	193	
107456	2	
108111	3	
108975	17	
109181	42	
109644	10	
111282	4	
111429	1	
112495	14	
112919	25	
113281	25	
113282	50	

W 10/02/03

January 6, 2010 3:50:34 PM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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# Picklist Print

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Work Order ID: 55133

Parent Item: D212-664-101

Parent Item Name: Crosstube Fwd

Start Date: 07/01/2010

Required Date: 28/01/2010

Comments: IPP RevH: 28 per ECN09-696 09.11.19 DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D2893-1		Manufactured	No			220	Each	67.0000	2.0000			

2.75 Support

Warehouse	Loc Qty	Loc Code
<u>Location</u>		
Main Warehouse		
ST	67	
25657	6	
47109	2	
47637	11	
51775	19	
53125	19	
53340	10	

m/ 10/02/03

D3428-1

Manufactured No

240

Each

9.0000

1.0000

Placard

Warehouse	Loc Qty	Loc Code
<u>Location</u>		
Main Warehouse		
ST096	9	
50790	9	

10-2-24

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Parent Item Name: Crosstube Fwd


Start Date: 07/01/2010

Required Date: 28/01/2010

Comments: IEP RevH: as per ECN09-696 09.11.19 DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Rot Seq	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN6-35A		Purchased	No			240	Each	80.0000	4.0000			
												
BOLT												

1072-8 SP

Warehouse	Loc Qty	Loc Code
Location		
Main Warehouse		
ST	80	
112314	30	
112805	20	
113422	30	

AN6-36A

Purchased

No

240

Each

115.0000

4.0000



Bolt

10-2-4 SP

Warehouse	Loc Qty	Loc Code
Location		
Main Warehouse		
ST	115	
109632	1	
110382	2	
112314	62	
113121	50	

4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Parent Item Name: Crosstube Fwd

Start Date: 07/01/2010

Required Date: 28/01/2010

Comments: IPP RevH: as per ECN09-696 09.11.19 DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

Complete Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21042L6 Nut		Purchased	No			240	Each	484.0000	6.0000			

10-2-4 SP

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	484	
105077	22	
110002	5	
111548	8	
111578	400	
112492	49	

AN960JD616

Purchased

No

240

Each

669.0000

18.0000



Washer

10-2-4 SP

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	669	
112314	3	
112828	366	
113149	300	

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W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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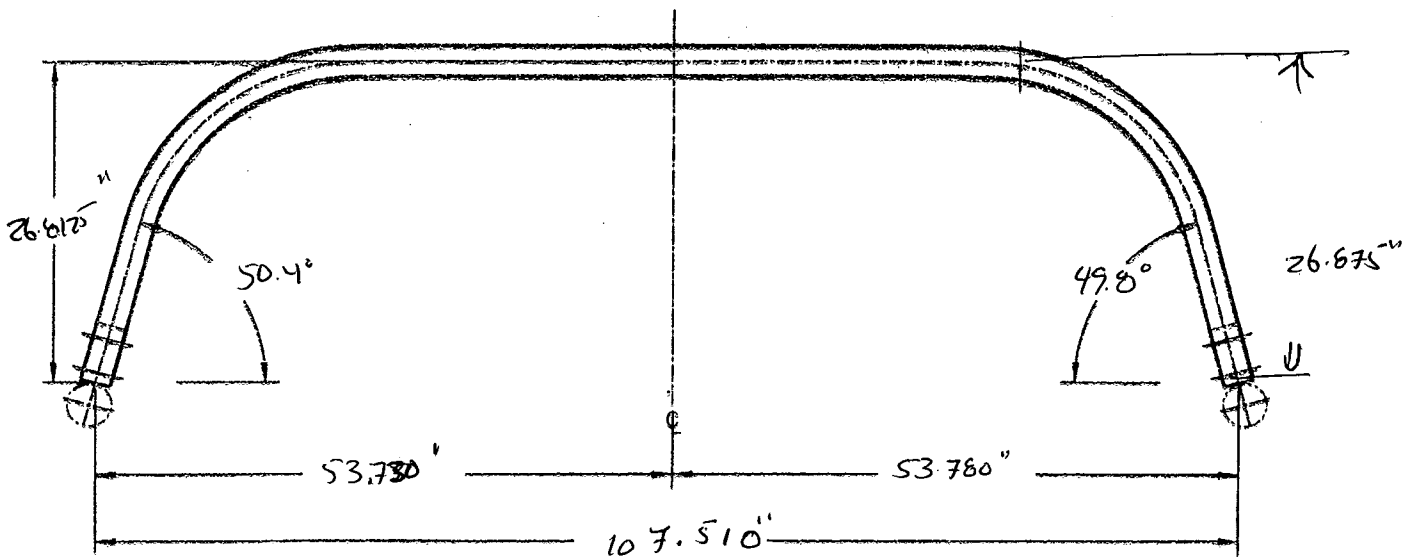
**NOTE:** Date & initial all entries



<b>DART AEROSPACE LTD</b>	<b>Work Order:</b>	<b>55133</b>
<b>Description: Crosstube High Fwd (205/212/412)</b>	<b>Part Number:</b>	<b>D212-664-101</b>
<b>Inspection Dwg: D212-664-141</b>	<b>Rev: 0 D</b>	<b>Page 1 of 1</b>

*E 10.01-26*

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7



Comments

QC15 Inspection	<i>S</i>
Date	<i>10/01/26</i>

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM	<i>[Signature]</i>

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



Item	Qty -141	Qty -141B	Part Number	Description
1	X		D212-664-141	CROSSTUBE ASSEMBLY (205/212H12 HIGH FWD)
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-26	CLAMP (OR MS21920-26)
7	AVR	AVR	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEKTRON/BELL SPEC. 293-047-100, TYPE II, CLASS 2 ADHESIVE)

#### GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6005-128  
FINISHED LENGTH = 126.514±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF  
USING VIBRATING STYLUS
- 7) WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)  
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 030
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING
- 13) INSTALL MS21920-26 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING

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WORK ORDER  
NO. 55733  
BA 10-1-06

RELEASED  
2009-10-28  
AD

D	REFORMAT/REVIEW GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (2N 84-2, 04-2); REMOVED REF & ADD TOLERANCES (2N 84-3, 06-3, 08-3 & 55-3); RELOCATED PLACING PER PART 08-08 (2N 85-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398 CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATIBILITY WITH BHTPA SMD TUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	<u>AD</u>	DART AEROSPACE LTD	
DRAWN	RF	HAMMERSLEY, ONTARIO, CANADA	
CHECKED	<u>P</u>	DRAWING NO.	REV. D
MFG. APPR.	<u>B</u>	D212-664-141	SHEET 1 OF 4
APPROVED	<u>AD</u>	TITLE	SCALE
DE APPR.	<u>AD</u>	CROSSTUBE ASSY (D212-664-12 HIGH FWD)	NTS
DATE	09.09.30	COPYRIGHT 2009 BY DART AEROSPACE LTD THIS DOCUMENT IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE. IT IS THE PROPERTY OF DART AEROSPACE LTD AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT PERMISSION IN WRITING FROM DART AEROSPACE LTD.	

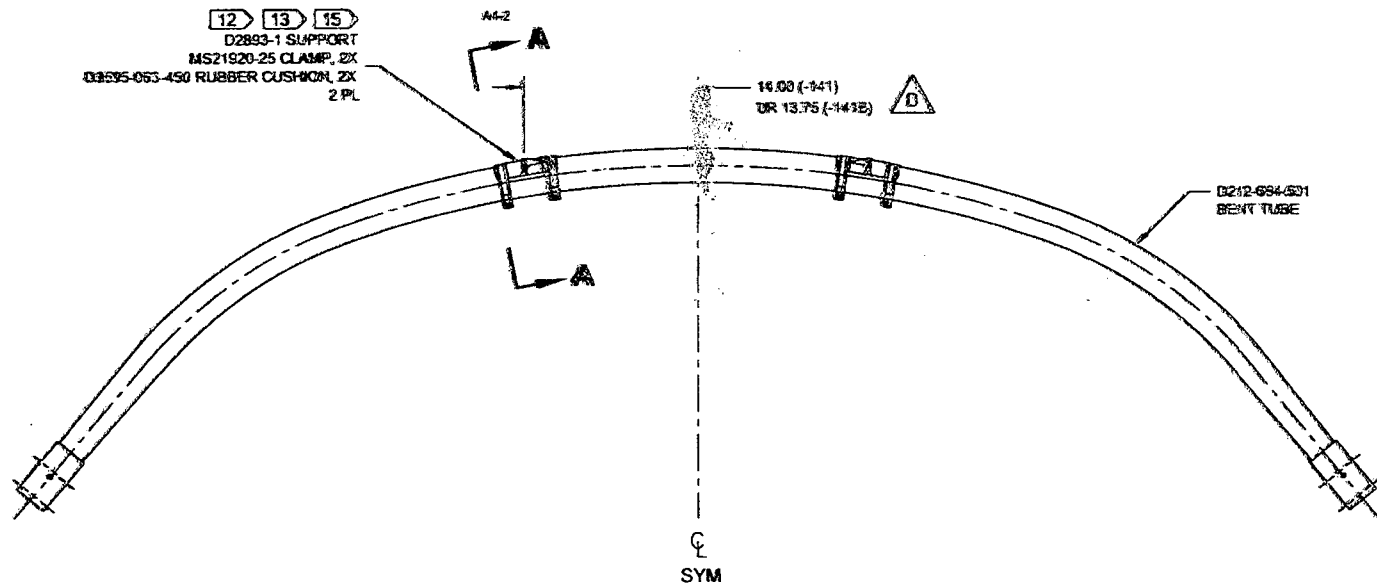
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

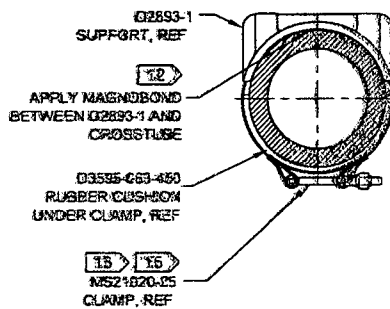
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



**D212-664-141/-141B**  
**ASSEMBLY DETAIL**



**SECTION A-A**  
SCALE 4X D5-2

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R 10-39  
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W/O 55133

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CHECKED	RF	D212-664-141	SHEET 2 OF 4
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APPROVED	RF	XTUBE ASSY (D212-664-141 FWD) NTS	
DE APPR.	RF	DATE 09.09.30	

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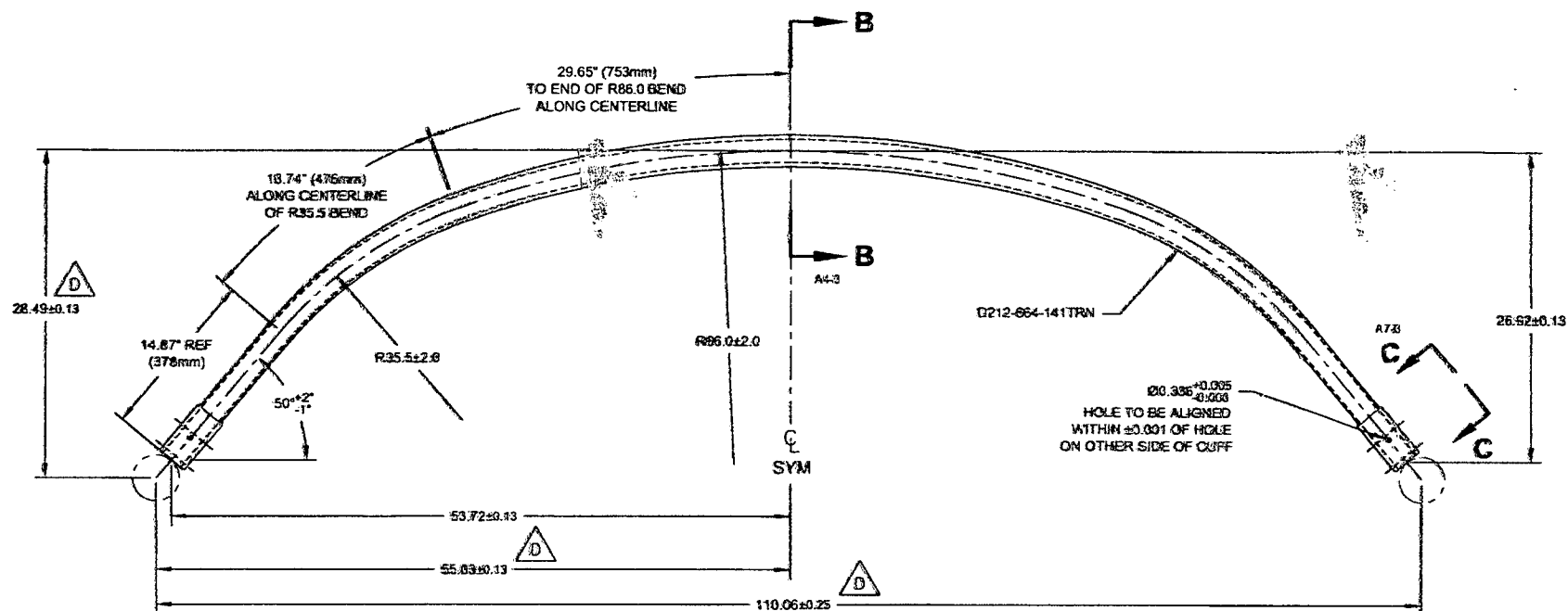
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

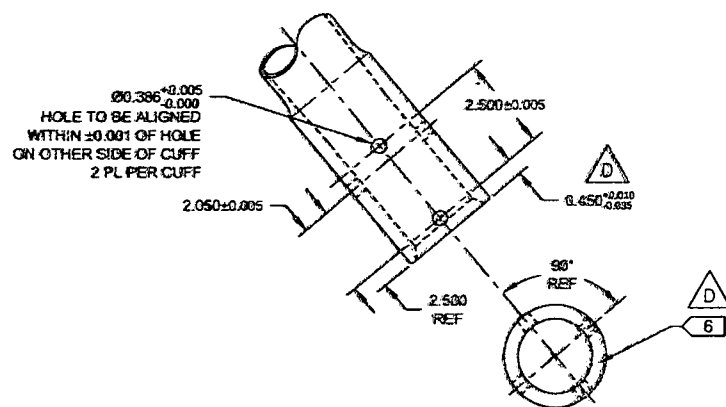
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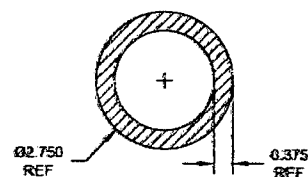
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**D212-664-501**  
**BENDING AND DRILLING DETAIL**



**VIEW C-C: CUFF DETAIL**  
SCALE 3X



**SECTION B-B**  
SCALE 4X

**RELEASED**  
2009-10-29

*W/O 55133*

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CHECKED	RF	D212-664-141	SHEET 3 OF 4
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DATE	09.09.30		

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DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

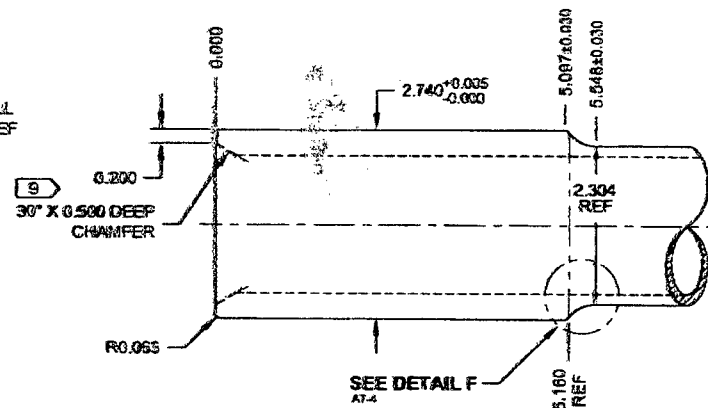
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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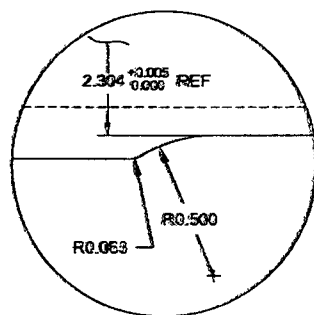
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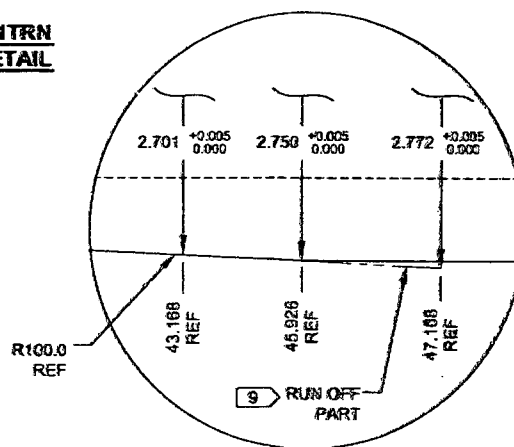


**DETAIL D:**  
**CROSSTUBE CUFF** D8-4  
**SCALE 5X**

**D212-664-141TRN**  
**TURNING DETAIL**



**DETAIL F:**  
**CUFF TRANSITION** C24  
**SCALE 10X**



**DETAIL E:**  
**TAPER RUN-OFF** 654  
**NOT TO SCALE**

RELEASE  
2009-10-29

**DART AEROSPACE LTD**  
HAMMERSBURY, ONTARIO, CANADA

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**NOTE:** Date & initial all entries



# LIQUID PENETRANT TEST REPORT

P- 15316

CLIENT DAI HOSPACE DATE FEB 1-2010 PAGE 1 OF 1  
ATTENTION LINDA ACUREN JOB No. 188-10-0650 TIME AM ☒ PM ☐  
ADDRESS 1270 ABERDEEN ST. POWO No. 11290  
HAWKESBURY ON. WORK LOCATION HAWKESBURY  
K6H 1K7 ACCEPTANCE STD. ASTM 1417 REV./DATE 2007  
PROJECT F.P.I. ON CROSS TUBES  
ITEM(S) EXAMINED (12) SLEEVE'S (6)

JOB DESCRIPTION  
PART NO. STAINLESS STEEL PROCEDURE NO. LT-002 REV./DATE  
SCOPE WET FLUORESCENT LIQUID PENETRANT INSPECTION MATERIAL ALUMINE ALUMINUM THICKNESS  
CARRIED OUT 100% EXTERNAL

TEST DETAILS  
METHOD ☒ FLUORESCENT ☐ VISIBLE  
FAMILY BRAND MAGNAFLUX ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED  
PENETRANT 2L 6F MINIMUM DWELL TIME 45 MIN. BLACK LIGHT S/N 16459 ☒ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT < 2 fc  
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE  
DEVELOPER SKD 152 MINIMUM DWELL TIME 10 MIN. OTHER LADNO  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY LIGHT METER S/N 1098866 CAL DUE DATE MAR 7, 2010

TEST SURFACE  
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☐ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/ 50°F ☐ 10°C/ 50°F TO 52°C/ 125°F ☐ > 52°C/ 125°F  
RESULTS- ☐ METRIC ☐ IMPERIAL

12 SLEEVE'S - W.O. 55638 ✓  
1 CROSS TUBE - W.O. 55132 ✓  
1 CROSS TUBE - W.O. 55133 ✓  
1 CROSS TUBE - W.O. 55406 ✓  
1 CROSS TUBE - W.O. 55404 ✓  
20 COLLECTIVE BELL CRANK - W.O. 53635 ✓  
1 MOUNT - W.O. 55097 ✓  
1 CROSS TUBE - W.O. 55433 ✓  
1 CROSS TUBE - W.O. 55434 ✓

ALL ITEMS EXAMINED ON THIS  
REPORT WERE FOUND ACCEPTABLE  
TO THIS STANDARD.

MA 10 02 02

Scope of Services  
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.  
Standard of Care  
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES  
CLIENT REPRESENTATIVE MATTHEW MURDOCH DTR # E-27697  
TECHNICIAN (SIGNATURE): MIKE JANSSEN SIGNATURE  
NAME (PRINT): MIKE JANSSEN REPORT REVIEWED BY:  
CGSB LEVEL II SNT LEVEL II CGSB LEVEL II SNT LEVEL II  
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